established levels of blood lipid to determine the patient's blood lipid level;

susceptibility to angina observed in a control population, or in the patient, at the measured rate;

established levels of blood lipid to determine the patient's relative or absolute blood lipid level; or

a combination thereof.

15. (Amended) An apparatus for measuring diffusion of oxygen across a red blood cell membrane comprising an oxygen level detector, a gas exchange system, and a red blood cell transport system;

the red blood cell transport system being configured to transport a fluid containing red blood cells through the gas exchange system and the oxygen level detector, the red blood cell transport system comprising:

a) a sample receiving system configured to take in a sample of a red blood cell;

b) a pump configured to transport a red blood cell from the sample receiving system to the gas exchange system and the oxygen level detector;

the gas exchange system configured to couple to a gas source and to exchange a gas with the fluid containing the red blood cells at a rate faster than the rate at which the gas diffuses across a membrane of the red blood cell, the gas exchange system comprising:

a) a housing defining a gas inlet, a gas outlet, and a chamber;

b) a gas permeable tubing at least partially located within the housing for diffusing the gas from the chamber to a red blood cell contained within the gas permeable tubing;

the oxygen level detector configured to detect oxygen levels in a red blood cell or in fluid surrounding the red blood cell, the oxygen level detector comprising:

a) a light source producing light having an absorption free wavelength;

b) at least one filter;

c) photopickups to detect the trasmission of light at the absorption free wavelength; and

a control system comprising a microprocessor electronically coupled to the oxygen level detector, the gas exchange system, and the red blood cell transport system to operably derive amounts of oxygen levels in a red blood cell.

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19. (Amended) The apparatus of claim 15, wherein the gas exchange system comprises a closed loop diffusion system; the closed loop diffusion system comprising the gas permeable tubing and the housing.

20. (Amended) The apparatus of claim 15, wherein the pump of the red blood cell transport system comprises an aspirator.

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22. (Amended) The apparatus of claim 15, further comprising a cartridge-type insert; the cartridge-type insert and the red blood cell transport system comprising the gas permeable tubing; the cartridge-type insert being configured to be inserted into the apparatus, and removed from the apparatus for disposal.

23. (Amended) The apparatus of claim 15, further comprising a modular system insert and a receiving and diffusion system, the modular system insert and the red blood cell transport system comprising the receiving and diffusion system; the receiving and diffusion system being configured to exchange a gas with a fluid containing red blood cells; the modular system insert being arranged and configured for inserting into the apparatus, removing from the apparatus, and disposal.

24. (Amended) A method for determining a patient's susceptibility to angina, comprising:

obtaining a blood sample from the patient;

measuring a rate of oxygen diffusion across a membrane of a red blood cell of the blood sample;

correlating the measured rate with the susceptibility to angina observed in a control population, or in the patient, at the measured rate; and

correlating the measured rate with residence time of the blood in the heart during stress.

Please add new claims ~~34~~-56 as follows.

34. (New) The apparatus of claim 15, wherein the gas permeable tubing comprises a lumen effective for containing red blood cells; the housing configured to expose successive sample of red blood cells to the gases without cross-contamination between the samples.

35. (New) The apparatus of claim 15, wherein the sample receiving system comprises a vacutainer.

36. (New) The apparatus of claim 15, wherein the sample receiving system is reversibly coupled to the apparatus for disposal after use.

37. (New) The apparatus of claim 36, wherein the sample receiving system reversibly clips to the apparatus.

38. (New) The apparatus of claim 15, wherein the sample receiving system comprises a syringe.

39. (New) The apparatus of claim 15, wherein the gas permeable tubing has a flat shape.

40. (New) The apparatus of claim 15, wherein the gas permeable tubing has a rectangular shape.

41. (New) The apparatus of claim 15, wherein the gas permeable tubing is a removable component of the gas exchange system for disposal of the tubing and red blood cells without contamination of the gas exchange system.

42. (New) The apparatus of claim 15, wherein the chamber of the gas exchange system is an environmental chamber having a predetermined oxygen atmosphere concentration within the chamber.

43. (New) The apparatus of claim 42, wherein the predetermined oxygen atmosphere concentration increases oxygen diffusion of a red blood cell by about 97.5% in about one minute.

44. (New) The apparatus of claim 42, wherein the predetermined oxygen atmosphere concentration is at about 40 mm Hg and decreases oxygen diffusion of a red blood cell by about 75.0%.

45. (New) The apparatus of claim 42, wherein the predetermined oxygen atmosphere concentration is at about 20 mm Hg and decreases oxygen diffusion of a red blood cell by about 40.0% in less than 20 minutes.

46. (New) The apparatus of claim 45, wherein the predetermined oxygen atmosphere concentration decreases the oxygen diffusion of a red blood cell in less than 2 minutes.

47. (New) The apparatus of claim 17, further comprising dual spectrophotometric detectors for determination of plasma oxygen and oxygenated hemoglobin.

48. (New) The apparatus of claim 15, wherein the light source produces light at a wavelength of at least 358 nm.

49. (New) The apparatus of claim 48, wherein the light source produces light at a wavelength of about 660 nm.

50. (New) The apparatus of claim 48, wherein the light source produce light at a wavelength of about 805 nm.

51. (New) The apparatus of claim 15, wherein the control system comprises a measuring system that measures the amount of diffusion at least once every 15 seconds.

52. (New) The apparatus of claim 51, wherein the control system further comprises a display for displaying the measurements taken by the measuring system of the apparatus.

53. (New) The apparatus of claim 51, wherein the control system further comprises a printer for printing the measurements taken by the measuring system of the apparatus.

54. (New) The apparatus of claim 51, wherein the control system further comprises a data retention apparatus for retaining data measurements taken by the measuring system of the apparatus.

55. (New) The method of claim 1, comprising:

correlating the measured rate with established levels of blood lipid to determine the patient's relative or absolute blood lipid level; and

further comprising comparing the patient's lipid level to the patient's previous lipid level.

56. (New) The method of claim 1, comprising:

correlating the measured rate with the susceptibility to angina observed in a control population, or in the patient, at the measured rate; and

further comprising correlating the measured rate with residence time of the blood in the heart during stress.